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Always remember that a true sportsman in every way is about the scarcest thing they make—and the finest. So naturally the common run of people don't live up to it.

If *you*—not the thinking you, nor even the conscious you, but the way-down-deep-in-your-heart *you* that you can't fool nor trick nor lie to—if that *you* is satisfied, it's all right. —*Stewart Edward White.*

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EDITORIAL

MAKING THE WINTER PAY

By Walter Fraine (President, 1917–1919)

Somewhere one of the poets, in speaking of the autumn, says:

"The melancholy days are come,
The saddest of the year."

Everybody figures on having a good time in summer. It is the universal playtime. Fall and Winter is a different proposition. It is the time to brace up and do something. Loafing is all right for hot weather, but the sharp bite of the frosty days calls for life and activity.

The children are busy in school. Their education consists of two things: people and books. They learn their lessons from their textbooks, but they learn mostly from the personality of their teachers and of the other boys and girls of their class.

The same is true of the American Electro Platers' Society. The active Branch offers a good school to its members. You cannot attend its regular meetings for six months without acquiring a respectable store of information. Finance, Parliamentary Law, and a dozen other equally important subjects are constantly finding their way into the Branch meetings. The regular attendant learns enough at every meeting to justify the time he spends, and it should be part of every member's obligation to so attend, take his part in making the meeting interesting and profitable and by his example encourage others to do likewise.

But the knowledge gained is only a part of the benefit. A circle of warm friendships is better than all the wisdom there is going. Knowledge is often a dangerous thing, but a good friend is better than his weight in gold every minute of the year. And there is no place where you can more surely find friends than in your own Branch. For the man who joins the A. E. S. in order to increase his knowledge, is already rich in the raw material out of which friendship grows. So attend the meetings of your Branch, take an active part in its work, and THE REVIEW guarantees that you will be satisfied with your investment. It will make the winter pay a big dividend in an increased knowledge of Electroplating, greater ability to handle your job, and, above all, many pleasant hours of social intercourse with your friends.

CORRECTIONS BY MR. O. J. SIZELOVE.

In the September number:—

The last line on page 10, Methyl Orange, should read, Phenolphthalein.

Page 11, line 12, Acetic Acid should read, Oxalic Acid.

Page 12, second last line, should read, 279.0018 divided by 28.35 and by 1.84 equals 5.36 oz. (fluid) per gallon.

ORGANIC SUBSTANCES IN ELECTRO-PLATING SOLUTIONS

Address delivered at the Indianapolis Convention, by Prof. F. G. Mathers, Indiana University

The addition agent in plating means the introduction into the bath of small amounts of materials, generally of an organic nature, that have a very profound effect upon the deposit. It may seem strange to you that the addition of one- or two-tenths of a per cent of an ounce per gallon would have a very pronounced effect on the deposit.

We know that these mere traces of things in material, affect very much the quality of the material. You are familiar with the fact that one-tenth of one per cent of phosphorous in steel would make that steel brittle. The sapphire is colored blue by one-tenth per cent of tetanum mixed with iron, and the fact that tetanum was necessary was not discovered at first because the quantity in the sapphire was so small.

Many plating operations are done by rule of thumb and that is very often necessary because the particular solutions very often is responsible for the addition of some substance that is necessary for the successful deposit. If one finds he must make a solution in a certain way, there is some reason for it, and if he will search far enough, it is possible he will find an important thing and he can add it in larger quantities and his results will be still better.

Some metals cannot deposit at all in a non-crystalline solid form without the use of an addition agent.

Most every organic compound will have some effect on the character of the deposit. But probably only a few of the organic substances will have what we might term a successful effect, and out of all those that have a beneficial effect, one or two will stand out as the best.

I have brought with me only the samples that show some of the more striking effects. The experiments with silver were carried out most with the silver nitrate bath. You know that is worthless for plating; the deposit obtained by passing the current thru a silver nitrate gives a loose mass of crystals on the cathodes that are loose. Silver is refined by that process, and the success of the apparatus depends upon the fact that these crystals are so loose that they can be knocked off from the cathode and strained out of the bath and re-melted and cast.

The addition of a small amount of glue will make those crystals a little more adherent and make the deposit a little more solid; the glue lacks a lot of being a successful addition

agent in that it does not make the deposit absolutely solid and free from crystals.

I have a small cathode that was deposited from a solution of silver nitrate and nitric acid (there was some phosphoric acid). I am going to show you this as a sample of what you are likely to get if you pass the current thru a silver nitrate nitric acid bath. You can compare it with the other deposits using addition agents, and see the effect.

The best addition agent to prevent the crystalline structure of the silver is tartaric acid, and I have here a sample of a silver deposit from a bath with the same composition as regards silver nitrate and nitric acid and the bath containing tartaric acid. You see how hard it is, the crystalline structure has disappeared and in place of that we have a solid deposit that can be built up to any thickness. It is somewhat brittle, but will stand a good deal of handling.

There are other things beside tartaric acid that can be used. One of the other things is meta-phosphoric acid. If we add a little glue, it gives a smoother deposit, and if I add iron the deposit comes out dark.

Mention was made that the iron deposit with the nickel had some important effect. Here we find iron is deposited with a metal like silver, and it has an effect in that it darkens the deposit when it comes out of the bath.

Other addition agents have the opposite effect. These make the deposit firm, but if we add oil of peppermint to the bath, the deposit comes out loose and can be knocked off, but not with large crystals.

There is no doubt but what these addition agents are deposited along with the metal, and they are in the cathode after it is taken from the bath. We know that because in the case of iron, we can analyze the cathode and determine the iron very readily. If the cathode is heated, it is possible under the right conditions to smell the odor of burnt tartaric acid and if the cathode is heated it enlarges. In other words, this tartaric acid is mixed thru the silver and on heating swells up the cathode.

I have made no experiments with the silver nitrate bath. Antimony is an element that is not often plated. I have always felt that one reason was that there were not very good baths in which antimony can be plated. If one deposits antimony from a chloride bath, it gives a form known as explosive antimony. This cathode, after drying, if it is gently heated, will become warm and give off a gas.

We tried a number of antimony baths and we found that probably antimony fluoride was the best one. If a current is

passed thru antimony fluoride solution, we get a deposit that after a time is quite thick, but very rough. If we add a small quantity of various addition agents, the deposit will come out smooth.

This is a sample that was gotten by the use of .025 of a gram of alloin, added twice each day. You can translate these grams or per cents into ounces per gallon, so twenty-five thousandths of a per cent would be .025 of an ounce per gallon of solution. If we add a very small quantity of clove oil with the alloin, the deposit becomes a little smoother and glassy. And the last deposit was from the same bath containing a little bit of clove oil. If much clove oil is added, the deposit is so hard that it will crack off. We made a ten per cent solution of clove oil in alcohol and added two drops of that to every hundred cubic centimeters of bath.

Any of the books on plating describe a good many baths for the deposition of tin. We have tried out most of those baths, and from our standard we say they are unsuccessful. They give deposits that are too crystalline, and we are not able to get a sufficient thickness. One of the baths that is widely described is the tin oxalate bath. The deposit gotten from that is exceedingly crystalline, and I have had to hang it inside of a frame in order that the crystals should not drop off. All of the experiments that we tried would not give us a solid deposit without the use of some addition agent to overcome this crystalline structure.

We tried a great many addition agents to overcome the crystalline structure, and glue is not one of the successful things. It does not prevent this crystalline structure. Peptone will prevent crystals. It is made from eggs. It is somewhat similar to glue but it is expensive, so that it is out of the question to use it commercially, and I do not consider this tin bath successful because organic baths have a tendency to deteriorate.

I had always kept the idea before me that there was some combination of materials that would work in some of the ordinary tin solutions. We made up tin chloride, tin sulphate, tin fluosilicate, tin fluoborate, and tried all of these addition agents that we could think of. None of them worked. I kept on trying, knowing that there must be something that would do the work. After a great many experiments I think I have found an addition agent that will work in a tin sulphate or tin fluoborate or any other tin solution with the exception of the chloride.

I have samples of these heavier cathodes of tin that have been deposited from a mixture of tin sulphate and tin fluo-

silicate, plus the addition agent. I have a few deposits of this tin in smaller articles and on a thin deposit, so that you would get an idea of how smooth it is.

Here is a sample that I have been coating. You can try a knife on it and see how firm it is.

There is something about a chloride bath that prevents this addition agent from having its effect. I do not know what it is, but if I make up a chloride bath of exactly the same tin concentration as the sulphate, use the same addition agent, the same quantity, I cannot get a firm deposit. What is more, if I add a few per cent of hydrochloric acid to this tin sulphate bath, it prevents the formation of a smooth deposit; inside of this box is a sample of a small cathode made from a perchloride bath, and it is about as good a sample as I could get out of a chloride where the sulphate works perfectly, and this sample was so loose that I had to pour lacquer on it to hold it together.

Lead is probably the best known case of the use of an addition agent. If you do not put in any glue, you get a mass of crystals that are worthless as regards the protective coating. Lead was refined for a number of years in this country using lead fluosilicate bath with glue before much plating was done.

I have two samples of lead cathodes gotten from plating operations in Omaha. This is a sample about as smooth as they attempt to get, and this is about as rough as they will tolerate. They can get thick deposits that are very much smoother.

I started all this work using lead, beginning with the idea that perchloric acid would change the lead into solid lead perchlorate and give a good plating bath. I found that if I used glue as an addition agent, I did not get a good deposit. This is the sample of lead perchlorate deposit with glue as an addition agent. You see, the crystals have grown out of the cathode, and it is not perfectly satisfactory. The addition agent may work with one sort of a metal, and may not work with another sort. If I use peptone, however, I got a solid lead deposit on the lead perchlorate. This is a sample of deposit from lead perchlorate with peptone as addition agent, whereas the glue did not give a good deposit, as shown by the sample ahead of this.

Peptone is expensive, so we tried a number of other things, and it developed that clove oil was probably the best addition agent for the lead chlorate bath. I have a larger deposit that is made from the lead perchlorate bath with clove oil as an addition agent.

Clove oil is not so satisfactory in the lead fluosilicate bath.

It is a good effect, but it is not as good as the glue. This sample gives you an idea of what can be gotten from lead perchlorate.

If the current is passed thru lead acetate solution, acidified with acetic acid, less of loose crystals is obtained and there I felt the necessary thing was to find the necessary addition agent. After a great many experiments, I was able to prepare a deposit like this, which is about as thick as the perchlorate deposit but not quite as smooth, and this is gotten not from the acetate, but from the lactate. It was necessary, in addition to the use of lead lactate and lactic acid, to put in a conducting salt, and I used ammonium perchlorate and the addition agent was barbadoes aloes, which is a common drug in pharmaceutical work.

Instead of using ammonium chlorate, it is possible to use sodium nitrate, and here is a deposit from a bath that had sodium nitrate. Some writers claim it is impossible to deposit from a bath containing an oxidizing agent, but this is a sample of that.

A better addition than the barbadoes aloes is the residue that remains after the aloes is extracted. I obtained a sample of the aloes residue, and used it in these baths.

All of these samples that I have shown you have been obtained by the electrolysis of acid solutions. I have not done much work with alkaline solutions.

I want to show you a few samples of lead deposited from a solution made by dissolving lead acetate in sodium hydroxide with the use of addition agents.

This first sample was gotten by the electrolysis of that bath without an addition agent. The bath was run on a rather high temperature. I ran this bath at 190° Fahrenheit; the higher the temperature, the better the deposit. If I added certain addition agents, a great deal of the crystalline structure could be eliminated and those addition agents belong to the families of fatty acids, so that this first deposit, which is the best, is gotten by the addition of 1% of gumsanarac, the next deposit with the addition of 1% of oleac acid, the third one was with resin in the bath.

That bath is not convenient to operate, and I would not consider it a substitute for the acid lead bath, but it shows that these addition agents have an effect on the bath.

In alkaline baths the addition of a small amount of addition agents will be found effective. We tried the same sort of addition agents on tin, taking tin chloride, adding sodium hydroxide, and adding the addition agent. If one attempts to obtain a thick deposit of the tin from the bath, you get

these crystals, and you can see the little crystals that have formed around on the edge, and they are stuck on with a lot of lacquer. If I add my addition agents, those crystals will be supressed to a large extent; in this sample I have one per cent of resin and you see there are no crystals on there, and in this second one I have added balsam capyra—that is somewhat better than the resin, but more expensive. One difficulty about this bath is that it has a tendency to deteriorate. I always want a bath to maintain itself in the anode, and to work on indefinitely without the addition of very many outside materials.

We found that if this bath was allowed to stand, there was a great deal of oxidation and that bath would no longer work, unless we added more of the tin salt and, as I said, one of my standards is that the bath must maintain itself better that that.

I have here a sample of a cathode that was gotten after the bath stood about two weeks, and you can see that this deposit is very much less coated than the first one, and here is the deposit out of the balsam capyra bath that had stood about two weeks. We did not consider that the sodium hydroxide stannous chloride bath was successful because we were not able to put a thick deposit and the stannous bath was not suitable.

You may like to know why these substances have this effect, why these addition agents will have such a wonderful effect on the deposit. I am not able to answer that. I have an idea that one of the necessary things is that the addition agent must form some kind of complex or combination with the salts or substances in this bath. The addition agents that are of effect are things that are known to form compounds or double salts with various elements. Tartaric acid very commonly gives complex compounds and that was a very important thing in the silver deposition. You know that glue is very readily absorbed by a number of things, and that it is a very active addition substance. I am not able to prove this, but the addition agent must be united or absorbed by the metal that is being deposited, otherwise it would not be found in the cathode.

There must be some kind of combination in the bath in which the acid part of the salt takes part. Otherwise we would expect an addition agent to work with all of the salts of a metal equally well. In other words, glue should work equally well with all lead salts if it is merely a case of the attraction of lead for glue. But glue does not work equally

as well with all lead salts, therefore the acid combined with the lead must have some effect.

The same thing is brought out clearly in the case of the tin because the addition agent that is successful for the tin sulphate, will not work with tin chloride. And this addition agent that works with tin sulphate or fluosilicate or fluoborate does not work nearly as well with tin fluoride. There again the acid ion must in some way be important in the character of the deposit. That is the thing that made me say this afternoon that I felt probably the fluoride in the nickel bath must have some specific action. The important action of the acid in the bath is brought out in another way.

The addition of a very small amount of potassium iodide will prevent the formation of a smooth deposit of lead. It also interferes with the tin deposition. Therefore we know that the minutest traces of these acid ions or iodine ions has an important effect.

Q. Is the one per cent of the constituents of the bath water and all?

A. Just the addition agent. All of these are made up on the so-called per cent basis, that is so many pounds of the material in a hundred pounds of bath. That is, a one per cent solution would have one pound of material added to one hundred pounds of solution.

Q. How long have these samples been in the bath?

A. From two to three weeks. We do not pay a great deal of attention to them in between times. We get around once a day to stir up the solution or add a little more water. The baths are stirred enough to keep the concentration from becoming heavier on the bottom than it is on the top. I have an apparatus for mechanically stirring these baths.

AUSTRALIAN MEMBER TO VISIT US

Mr. Perry H. Richards, of Perth, West Australia, writes THE REVIEW that he will visit in England during the next three months, and that in all probability he will return to his home via the United States.

THE REVIEW extends to Mr. Richards a cordial invitation to visit as many members as his stay in our Country will permit. We also trust that he will find it possible to visit some of our Branch Societies and tell us of the many things there is to tell about the wonderful country from which he comes.

THE ELECTROLYTIC REPRODUCTION OF ENGRAVED PRINTING PLATES

Abstract of Address delivered by William Blum[1] and Thomas F. Slattery[2]. American Electroplaters' Society, July 1, 1921.

In 1918 and 1919 the printing requirements of the Bureau of Engraving and Printing increased greatly owing to the large issues of bonds and other securities, and to the increased demand for currency. In consequence it was found difficult to prepare the required number of printing plates by the mechanical transfer process, which was previously used entirely for this purpose. When electrolytic methods of reproducing these plates were first investigated, it was found that although accurate reproductions could be thus secured, plates which were similar to the ordinary electrotypes, or even plates consisting entirely of electrro-deposited copper did not possess sufficient strength to withstand the pressures used in plate printing. While conducting experiments in this connection, Mr. George U. Rose, Jr., Chief of the Engraving Division of the Bureau of Engraving and Printing, discovered that by the depositiion of alternate layers of nickel and copper it was possible to produce plates having the strength necessary for the above purpose. This process of depositing alternate layers of copper and nickel, which has been patented by Mr. Rose[3], is the basis of the method now used in the new electrolytic plant of the Bureau of Eugraving and Printing which was recently installed under the supervision of the Bureau of Standards.

The more rigid requirements of plates to be used in "plate" or "intaglio" printing arise from the fact that in this process the designs (which are all below the plane surface of the plate) are filled with ink, and in order to cause the paper to pick up this ink considerable pressure is required. On the other hand, in using ordinary printing plates (upon which the characters are in relief) the lightest possible pressure is used between the paper and the type. Because of the greater pressure required in using engraved plates, there is a tendency for these plates to curve in use unless they are sufficiently rigid to retain their form. Another special requirement for plate printing is that the surface shall have the greatest possible resistance to abrasion, as after each impression the plate is inked, rubbed with a mechanical wiper, and polished by hand, all of which operations exert more wear upon the plate than does the actual printing process.

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[1] Chemist, U. S. Bureau of Standards.

[2] Superintendent, Electrolytic Section, U. S. Bureau of Engraving and Printing.

[3] U. S. Patent.

The experimental work conducted at the Bureau of Standards toward the development of this process upon a commercial scale consisted therefore in the determination of the best condition for securing (a) accurate reproduction, (b) a durable printing surface, and (c) the necessary rigidity.

For the accurate reproduction of engraved printing plates it was found to be most satisfactory to prepare by electrodeposition a metal mold or negative of the original plate, rather than to attempt to take an impression in lead or wax as in the ordinary electrotyping process. As upon this metal mold the designs are in relief, this plate has been designated as an "alto." One advantage of producing the altos by electrodeposition is that any change in dimensions such as might possibly occur in wax or lead molding is avoided. For the production of such an alto from a steel plate the latter is first thoroughly cleaned and is then brushed with graphite in order to permit subsequent separation. Nickel is then deposited directly upon this surface, after which alternate layers of copper and nickel are deposited till any desired thickness is secured, which thickness is merely sufficient to insure reasonable rigidity when handling the alto in subsequent operations. This alto then serves as a form upon which to deposit the actual printing plate known as the "basso", which is an exact duplicate of the original plate. Needless to say, every precaution must be taken in these operations to avoid the presence of bubbles or foreign particles upon the surfaces during the initial deposition.

For the production of a durable printing surface, the most promising metals are probably nickel, cobalt, and iron. A few experiments were made upon cobalt deposition which, while by no means exhaustive, indicated that at least with our present knowledge, satisfactory deposits can be more uniformly obtained from the nickel baths than from cobalt. Some experiments have been carried out by us upon the possible application of iron, but it was concluded that this method could not be considered for immediate adoption. As opportunity offers, further work will be done with cobalt, iron, and other metals to determine their possible application.

It is not difficult to secure nickel deposits of great hardness, but unfortunately this hardness is usually associated with brittleness and with consequent curling and cracking of the deposit. It was found that by the addition of hydrofluoric acid or fluorides to the nickel solutions, as recommended some time ago by Mr. E. G. Lovering of Detroit, it is possible to employ higher current densities and to obtain deposits of greater tensile strength than in corresponding solutions con-

taining chlorides instead of fluorides.[4] Satisfactory results have been obtained by using either nickel fluoride (prepared by the solution of nickel carbonate in hydrofluoric acid) or sodium fluoride. Operating at a current density of about 20 amp. to the sq. ft., it is possible to obtain deposits of nickel up to a thickness of 0.02″ or more, with a tensile strength considerably over 100,000 lbs. to the sq. inch. Such deposits have proved very satisfactory upon the printing surface. Up to this time no reliable means of measuring the "abrasion hardness" of thin layers of metal has been developed; but as a first approximation it has been assumed to be proportional to the ultimate tensile strength.

As above noted, the use of alternate layers of copper and nickel leads to the production of plates of very much greater tensile strength than can be obtained with copper alone. Microscopic examination of deposits thus produced shows that the beneficial effect of the nickel is not due alone or principally to the greater tensile strength of the nickel, but rather to the effect upon the structure of the deposited copper produced by the interdeposition of layers of nickel. The presence of each layer of nickel prevents further growth of the copper crystals and thereby causes the layer of deposited copper to have a higher tensile strength than it would if it consisted of coarse crystals. The use of nickel layers is also a great advantage in reducing the tendency to form trees, which tendency is particularly objectionable in the production of thick deposits of copper at relatively high current densities. Except for the presence of the nickel layers it would be impossible to use the current densities here employed for copper deposition without producing very rough and badly treed deposits, which would require an excessive amount of labor for finishing and would represent a considerable waste of material.

In the actual production of the bassos or printing plates an initial coat of nickel is deposited at 10 to 20 amp. to the sq. ft. for six hours, and which has therefore a thickness of about 0.005″. Alternate deposition of nickel and copper for periods of one hour each is then continued for about six days. The current density used for nickel is about 20 amp. to the sq. ft. and for copper about 50 amp. to the sq. ft., so that the relative thicknesses are approximately in the ratio of 1 to 3; in other words, the plates contain about 25 per cent of nickel. A final layer of copper is deposited for one or two days. This latter material is largely removed in the subsequent machining

[4] William Blum—The Use of Fluorides in Solutions for Nickel Deposition. Trans. Amer. Electrochem. Soc., 39, 227 (1921). Chem. Met. Eng., 24, 1109 (1921).

operations. Its principal purpose is to fill up any small depressions that may exist at the end of the alternate deposition.

After separation the plates are machined and ground by means of appropriate equipment to a thickness of 0.25″ and to the desired size. Plates prepared in this way are now being used successfully for the printing of securities and are yielding impressions fully equal in appearance and accuracy to those prepared from steel plates. The present average service of the plate is about 40,000 impressions. It is believed, however, that by further improvements and by increased experience in the methods of using such plates this service may be appreciably increased.

Numerous details of the process are still under investigation. When these studies are completed it is expected to publish as a Technologic Paper of the Bureau of Standards a detailed description of the plant and equipment used for this purpose. The experimental work upon this process was conducted largely by W. E. Bailey, L. D. Hammon, and H. E. Haring of the Bureau of Standards. Valuable suggestions and advice were received from George B. Hogaboom, Electroplating Adviser of this Bureau, and Chas. Barbour, Asst. Supt. of the electrolytic plant at the Bureau of Engraving and Printing.

DEPARTMENT OF COMMERCE
BUREAU OF STANDARDS
Washington

September 16th, 1921.

PHILIP UHL, President A. E. S.,

Subject: Nickel Investigation

We are pleased to note from your letter of September 14th, that you have appointed a Research Committee of three to represent the Electroplaters' Society and to advise the Bureau of Standards upon the researches in this field. Some time in October we hope to have this Committee meet in Washington to discuss this work. We will get in touch with each of the members some time in advance of the meeting.

Thanking you and the Electroplaters' Society for your co-operation in this work,

Respectfully yours,
F. C. BROWN,
Acting Director.

PLATING DIE CASTINGS

By Roy Stout, Newark Branch.

Plating of die castings has been well discussed lately. The writer has nothing new to offer in this paper, but will try to give his method of handling this line of work.

The work is first emeried out on a fine grade of emery, then cut down with tripoli, and if the work has recesses it is washed out in gasoline, dried in sawdust and then colored up on a soft wheel with lime composition. Care must be taken that these castings are free from finger-marks and lime composition.

They are then racked, or wired, emersed in a weak kalye solution. This solution is never used boiling. Washed off in water, dipped in cyanide, washed, stuck in a cold cyanide copper solution free in cyanide just long enough to cover the articles. Then they are rinsed off and put in nickel solution and plated for about ten minutes at about two volts. Then they are rinsed, dipped in hot water and dried. The nickel solution I use is made of double and single nickel salts and sodium chloride:

Double Nickel Salts.....9 ozs.
Single Nickel Salts.....1 oz.
Sodium Chloride .....4 ozs.

If it streaks, more salt is to be added. Salt is added quite frequently as required. I also have a small bag of double salts hanging in my solution to keep up the metal content of the solution.

GOLD PLATING DIE CASTINGS

To gold plate die castings the same process is gone thru, but I find that by raising the current from one-half to one volt more and striking them over quick in the nickel, and not running them so long, better results are obtained; then they are run a few minutes in a brass solution, scratched, brushed and gold plated in the regular gold solution, dried thru warm water and sawdust. Care must be taken not to get the articles very hot, as they are apt to blister.

[Property of Newark Branch, American Electro-Platers' Society.]

"A speech," a well-known lecturer says, "should be like a woman's street dress—long enough to cover the subject, but short enough to be interesting."—*Ladies' Home Journal.*

PRACTICAL QUESTIONS

New York Branch submits a question regarding the possibility of doing black nickel plating by the barrel process. The member bringing up the subject used a solution consisting of:

Double Nickel ($NiNH_4 SO_4$).....8 oz.
Zinc Sulphate ($Zn So_4$).....1 oz.
Sodium Sulpho Cyanide (NaS CN).....2 oz.

Using a pressure of two volts, and approximately four amperes per square foot—solution at room temperature—work about eight inches from the anode—using an oblique tilting barrel. He did not obtain a good black, but rather a medium brown, which, upon drying out in hot water and sawdust, became a lighter shade. The suggestion was made to add about 4 oz. of Sodium Sulphate ($Na SO_4$) to each gallon, which was done; this gave a slightly darker shade, but not a satisfactory one. The addition of $Zn SO_4$ did not seem to help matters much. By the addition of an amount of Rochelle Salts equal to the Zinc Sulphate used, the color became quite dark, although not a satisfactory black nickel. An addition of double salts—four oz. per gallon—was made, which seemed to produce the color more rapidly, but the next morning a very heavy, dark slate-colored precipitate was found. There has been nothing further done with this solution. Now, the question is: Can satisfactory black nickeling be done by the barrel process?

OBITUARY

Claude, S. Seeley, well-known and popular member of Detroit Branch, died at Detroit, September twenty-first, after a short period of illness.

Mr. Seeley was a very active member of the Society, and an attendant at the Annual Conventions.

The funeral services were held in Detroit; burial was at Dayton, Ohio, his former home.

Mr. Seeley leaves a widow and one son.

WHAT THE BRANCHES ARE DOING

GRAND RAPIDS

The regular meeting was held on Sept. 14th. In the absence of both the President and Vice-president, our honorary member, Prof. Keith Kennedy was called to the chair.

Mr. Poe, our Librarian, has been running a nickel solution on die castings and gave a summary of his experience in that very difficult line of plating.

Secretary-Treasurer Warner presented samples of steel, highly polished and plated heavily, and also very smoothly in a cyanide zinc solution, rinsed and heavily nickeled. The samples colored up very beautifully and could not be distinguisred from nickel on heavy copper by the appearance and finish. A lengthy discussion followed in which every man present took a part.

Mr. Allen gave a short talk on the present business outlook.

A committee was appointed to arrange for a smoker, to be held on the next regular meeting date, which will be October 12th.

GRAND RAPIDS

The regular meeting of October 12th was held as a smoker, with a good attendance of both members and visitors. A short business meeting was held, with President Whalley in the chair. After all the business had been disposed of as quickly as possible, the President introduced Principal I. B. Gilbert of Union High School, who gave a very interesting talk. We will quote from his address:

"The study of science is a most interesting and profitable recreation."

"Men should not be content with part of knowledge; all things, even aside from our own narrow lines, if they are scientific, are of interest, and some even of necessity to us."

"Your field is broad; more than usual in industry; therefore you should be constant students of your own and allied lines of study."

"Make your study broad."

"Nothing in education is so valuable as the study of science."

"The field of science deserves the respect of all men."

"There is always satisfaction in knowing something, and of getting somewhere."

Principal Frazee of the Vocation High School was next introduced; his first move was to get everyone on their feet to take a few physical exercises under his leadership. After the meeting was again in order he proceeded to give a good talk about the school, the most interesting part of which was about the practical experimental room to be assigned to the Grand Rapids Branch, both for use as a practical study-room, but also for our permanent quarters.

John Saur was the last speaker and the only one to use a subject, which subject was: "The Molecule—The A. E. S." The speaker expressed a feeling of much respect for the A. E. S. His argument was that in every molecule, the atoms must remain arranged in the regular molecular ararngement if the molecule is to remain in existence.

The individual members are the atoms that, in proper arrangement, compose the molecule, the A. E. S. Therefore without the individual members, all doing their part, the organization cannot remain a complete success.

After a short and spirited discussion of a question asked by Mr. McMeekin, the meeting was adjourned.

All voted the meeting a complete success.

NEW YORK

The last meeting of the New York Branch was held September 23. President J. A. Stremel presided. All officers were present. One application for membership was received and referred to the Board of Trustees. The outing of the New York Branch had to be called off on account of the hotel closing up at City Island, N. Y. But we will have a theater party and supper within six weeks.

Our Publicity Committee is arranging for an open meeting some time in the Fall, to be called Founders' Night. The following problems were under discussion: Plating zinc die castings; red precipitate in copper or silver cyanide solution; turning a brass solution into a copper solution; the use of mercuric dips, and the cause of cracking of brass; zinc plating bed springs; silver strips, silver strikes, and silver plating.

MILWAUKEE QUESTION-BOX

We submit the following questions and answers. All answers are open for the criticism which we solicit.

Question No. 1.—Is nickel that has been deposited slowly, more durable than when deposited rapidly?

Answer—As the grain is finer the plating is more durable, provided the work is plated long enough for a good deposit.

Question No. 2.—What is the best preparation for surface of a floor in a plating-room, base of floor being concrete?

Answer—First coat with asphaltum paint, then hot asphalt; while still hot sprinkle sand over the top.

Question No. 3—What makes the oxidizing on copper-plated articles flake and strip as soon as it is put into the hot water?

Answer—There is too much hyposulphite of soda in the cyanide copper solution.

Question No. 4—What will keep the anodes clean in a brass solution?

Answer—Use anodes free from lead and arsenic and sufficient free cyanide. The impurities, especially lead, are responsible for most of the scum.

Question No. 5—What is the best method to obtain a bright brilliant copper deposit on polished steel, polish not to be obtained by buffing or burnishing, but to be obtained by plating in a copper cyanide bath?

Answer—Dissolve 4 oz. Lead Carbonate and 8 oz. Caustic Soda in 1 gallon of water, then add 4 oz. of this solution for every 100 gallons of Cyanide of Copper solution.

BRIDGEPORT

Our meeting of September 16th was held in the Laboratory, with 11 members present. Mr. W. G. Stratton took the chair in the absence of Mr. Slattery.

The Secretary's report on the Outing was read and accepted.

The members all had a good laugh, talking about the Outing, and all are looking forward to the next one.

BRIDGEPORT'S OUTING

The Bridgeport Branch held an Outing on Saturday, September 10, at "The Farm," about fifty being present.

A very enjoyable afternoon and evening was spent by all.

The main event of the day was a ball game between Stratton's Old Timers and Slattery's Colts. The Colts have something to learn before attempting to play the Old Timers again, the score being 18 to 9.

The features of the game were Flaherty's nose dive from home to first, after which it became necessary for him to act as umpire. Some ump, ask Flannigan.

Mr. Rice twirled great ball in his new uniform (a pair of overalls).

Stars on base running were Stratton and Oberender.

Mr. Karl is some backstop, as his thumb will prove.

The women spent their time playing croquet, bowling, and rooting for the ball players.

After the ball game the dinner bell rang and all enjoyed a good shore dinner.

After dinner the evening was spent in dancing, bowling, pool and other games until a late hour.

In a pool match between Mr. Dunn and Phil Willett, Phil proved that he is still there when it comes to handling a cue.

The party broke up with everybody happy, and we expect that all will be waiting for the next affair of this kind.

PROVIDENCE-ATTLEBORO

The Providence-Attleboro Branch A. E. S. held their first meeting in September in Providence on September 1. The Branch is trying out some new ideas in regard to entertainment for the members. As education is the object of the Society, we have decided to try and bring before the members a method of solving in a practical way some of their everyday problems. How to determine the metallic content of the various salts, and how to analyze the different solutions, will be some of the subjects that will be taken up at the future meetings.

The metallic content of the various nickel salts and the way to determine the same was the subject for our September 1st meeting.

Our second meeting in September was held in Attleboro.

The question of holding our annual banquet came up for discussion, but was laid on the table for future consideration.

The meeting was well attended, and after the business of the evening was concluded, the members discussed among themselves the methods of overcoming the various troubles of a plater and colorer's business.

A solution that is being sought for by a number of colorers at the present time is one that will deposit a white metal capable of resisting acid. A number of formulas have been tried, but as yet none have given satisfaction.

We feel assured that with organized effort a satisfactory solution will be found.

The meeting adjourned to meet in Providence on October 6.

PHILADELPHIA

The regular monthly meeting was held on October 7, President Gehling presiding, with a good attendance of members. After the regular routine of business, Supreme President Uhl gave a talk on the work of the Supreme Body.

The question was asked: What is a good stop-off to coat wheels which had to have a coat of copper plate on the inside of the bore only? Parafine and asphaltum were recommended.

The Banquet Committee reported having made arrangements to hold our annuau banquet at the Hotel Lorraine, Broad and Fairmount Ave., on Saturday evening, November 19th, at 7:00 P. M., and that this will be the best ever. The price per cover will be $3.00, and each lady will receive a souvenir. Don't forget the date: **November 19.**

CONNECTICUT VALLEY

A regular meeting of the Connecticut Valley Branch A. E. S. was held at No. 8 Orange St., Hartford, Conn., on Tuesday, Oct. 11, at 8 P. M., President James A. Bagshaw presiding. Eight members were present. After the regular business was transacted, a committee of two was appointed to see what could be done in getting a permanent meeting-place. The meeting adjourned at 10 P. M., after which refreshments were served by Mr. and Mrs. William Legate.

CHICAGO

Our regular meeting was held October 8th, at our new quarters, "The Hardware Club of Chicago," 11th floor of the State-Lake Building. Everybody seemed to like the new place, and there was a good crowd out, and a very interesting meeting resulted.

The business session was disposed of in a short time, and the meeting was then turned over to the Librarian, who presented a number of interesting questions, and the discussions lasted until a late hour.

CHICAGO QUESTION BOX

Question No. 1—What causes red spots to appear on solid brass canopies in three or four months after they have been finished and lacquered?

Answer—In the annealing process cuprous oxide is formed and is not completely removed from the surface.

Another theory was that the mixture of brass might have contained a small amount of iron which would cause red spots to appear, due to the finishing operations.

Question No. 2—Does hydrofluoric acid cause nickel salts to crystallize and form on the anodes and sides of the tanks?

Answer—The consensus of opinion was that it does in a cold solution.

Question No. 3—Is it advisable to use hyposulphite of soda in a brass solution? Also what causes red streaks to appear on brass-plated work after bright dipping?

Answer—It is not advisable to use hyposulphite of soda in brass solutions.

Red spots may be caused by the electro-chemical effect of the base metal, due to insufficient deposit of brass.

Question No. 4—What is the best method to silver-plate white and bright? Should ammonia be used in silver solutions?

Answer—Carbon disulphide is the best brightener for silver solutions.

Ammonia should not be used.

Question No. 5—How can steel and sheet iron that has been soldered be cleaned on a production basis for nickel-plating?

Answer—This was referred to Mr. Hay's article in the September REVIEW, which answers the question thoroughly.

Question No. 6—Would like to have formula for nickel-plating die castings of 92% zinc.

Answer—Double and single salt solution with the addition of a little citric acid. Work should be agitated while plating.

Question No. 7—What causes anodes to turn black in hot copper solution when adding cyanide, and clear up when carbonate of copper is added? Solution stands 14° Baumé, but will not throw into a 5" pocket with 4 volts.

This may be caused by an excess of caustic soda. It might also be caused by an excess of free cyanide, or possibly by having the solution too hot.

Question No. 8—What effect has an excess of hyposulphite of soda on a brass solution?

Answer—It will cause the deposit to be dark, and with a very great excess the deposit will be almost black.

Question No. 9—What is the best way to get a French grey finish on brass for cheap work?

Answer—Nickel-plate first; then use a solution of muriatic acid and arsenic, with the addition of a little iron. Use either with or without current; work can then be relieved as desired.

BOSTON

Boston Asks a Question.

Boston Branch met at their new quarters, Wells Memorial Building, 987 Washington St., Boston, on Thursday evening, and had a very interesting meeting. The Recording Secretary was given the power to collect dues in the absence of the Treasurer.

One of the members told of the trouble that he was having with the gold work. He told of the pieces spotting-out and parts becoming etched and leaving little green spots of salts upon the work after it

had laid for three or four weeks. Some of the members discussed the question for more than two hours, but finally it was left as an open question for the other Branches. Let us hear what other Branches have to say.

PROVIDENCE-ATTLEBORO

The Providence-Attleboro Branch A. E. S. held their regular meeting in Providence Oct. 6. We had a very good attendance, and were favored by having with us members from Waterbury and Boston.

The main business of the evening was the question of holding our Annual Banquet. Most all of the jewelry firms of Providence and Attleboro have experienced a general slackening up of business and our members have naturally felt the effects of the same.

After carefully weighing the many advantages and disadvantages of incurring expense necessary to carry a banquet to a successful conclusion, it was decided to hold the annual banquet in Providence about the 10th of December.

Our visitors made appropriate remarks and gave some good advice, which we all appreciated.

President Harry Sholes appointed Brother Calvin Tyndall as Chairman of the Banquet Committee. After thanking the President for remembering him, Brother Tyndall announced that he would name his Committee later.

After having spent a very sociable evening, the meeting adjourned until October 20.

WATERBURY

The first October meeting of Waterbury Branch was held on Friday, October 14th, in the Chase Office lecture-room. There were over 100 present, including many manufacturers and purchasing agents.

Dr. Gibbons, Chief Chemist of a lacquer manufacturing company, gave an exceedingly fine talk on lacquers, their origin, manufacture, and uses. He invited those present to ask questions, and a lively discussion followed his talk.

Previous to Dr. Gibbons' talk, Mr. George B. Hogaboom spoke of the object and aims of the Society.

Our next meeting will be held October 28th, at which time Mr. Coleman, Chemist at the Scovill Mfg. Co., will give a demonstration on the testing of nickel solutions by the colormetric method as developed by the Bureau of Standards.

Whenever we encounter an admittedly dear girl who has a severe cold in the head and steady company, we wonder how she entertains both at the same time as successfully as she does.—*G. R. Press.*

NEW MEMBERS (October).

Boston

F. W. Greenwood.....Hotel Hamilton, Brockton, Mass.

Cleveland

F L. Abell.....222 California Ave., Lorain, Ohio

APPLICATIONS FOR MEMBERSHIP

Boston

H. A. Guertin.....81 Fairfield St., Worcester, Mass.

KNOWING HOW

Some men there are can talk of dates
And tell what old-time sages said,
And some can prate of traffic rates
And spout the chemistry of bread;
In education's varied lore
Is much to fill the minds of men,
But when a task we stand before,
It's "knowing how" that's needed then.

There are wise tongues which can expound
The deep philosophies of life;
Some know the laws which govern sound,
But it's an art to whet the knife,
Our printed pages all are rich
With wisdom from the gifted pen,
But when the world must dig a ditch
It's "knowing how" that's needed then.

The high diploma nicely framed
Is good to own and fair to see,
And no man here need be ashamed
To boast or treasure his degree,
But lost is learning if it finds
No outlet in accomplished deeds,
And vain becomes the polished mind
Unless to "knowing how" it leads.

He is an educated man
Who knows his work and does it well,
Who builds exactly to the plan
Or welds a joint or digs a well,
And though of him we little boast
Nor wreathe much laurel for his brow,
The man we need and use the most
Is he who serves by "knowing how."

—Edgar A. Guest.

An old-fashioned philosopher says, we see, that the average man uses his judgment to better advantage in selecting a cigar than he does in selecting a wife, but we don't know. There is so much wrapper to confuse one's judgment in regard to a cigar.—*G. R. Press.*

BRANCH DIRECTORY

BOSTON

Regular meetings are held second and fourth Thursdays of each month, at 8 p.m., at the Wells Memorial Hall, 987 Washington St., Boston. Secretary, A. W. Garrett, 37 Dorset St., Dorchester, Mass.

BRIDGEPORT

Meets third Friday of each month in its laboratory, 260 John St., Bridgeport, Conn. Secretary, L. J. Maraffi, 744 Hancock Ave., Bridgeport, Conn.

CHICAGO

Meets second Saturday of each month, at 8 p. m., at the Briggs House, Randolph and Wells Sts. Secretary, F. J. Hanlon, 2855 N. Richmond St., Chicago, Ill.

CINCINNATI

Meets on the first and third Friday of each month, at 1262 State Ave. Secretary, W. J. Husing, 729 McMakin Ave., Cincinnati, Ohio.

CLEVELAND

Meets every second and last Saturday of the month at 1344 E. Prospect St. Secretary, B. F. McCormick, 2024 Wyandotte Ave., Lakewood, O.

CONNECTICUT VALLEY

Meets at Hartford, Conn. Secretary, G. E. Vibberts, 31 Crown St., Hartford, Conn.

DAYTON

Meets first Saturday of each month at the Y. M. C. A., Dayton, Ohio. Secretary, C. Van Derau, 61 Bish Ave. Dayton, Ohio.

DETROIT

Meets first Friday of each month at Cass Technical High School, Platers' Classroom, 2nd Ave. and Beech St., at 8 p. m. Secretary, O. H. Phelps, 951 Clay Ave., Detroit, Mich.

GRAND RAPIDS

Meets on the second Wednesday of each month at the Vocational High School, 129 Bostwick Ave., NE. Secretary, J. Andrew Warner, 738 Fairview Ave., N.E., Grand Rapids, Mich.

INDIANAPOLIS

Meets the second Saturday of each month at Hotel Denison. Secretary, Louis Mertz, 1728 Union St., Indianapolis Ind.

MILWAUKEE

Meets first Friday of each month at the West Side Bank Bldg. Secretary, R. Steuernagel, 1508 Concordia Ave., Milwaukee, Wis.

MONTREAL

Secretary. A. Geroux, 48 Craig West, Montreal, Quebec, Canada.

NEWARK

Meets first, third and fifth Fridays of each month at Forresters' Home, 20 Central Ave., Newark, N. J., at 8 p m Secretary, O. F. Carlson, 225 West Grand St., Rahway, N. J

NEW YORK

Meets second and fourth Fridays of each month at the Broadway Central Hotel Parlors, New York City. Secretary, E. Haas, 504 East 163rd St., New York, N. Y.

PHILADELPHIA

Meets first Friday of each month in the Harrison Laboratory Building, University of Pennsylvania, 34th and Spruce Sts. Secretary, P. Uhl, 2432 North 29th St., Philadelphia, Pa.

PITTSBURGH

Meets first Saturday of each month at 8 p. m., at United States Bureau of Mines Bldg., Forbes St. Secretary, S. E. Hedden, 227 Fifth St., Aspinwall, Pa.

PROVIDENCE-ATTLEBORO

Meets first and third Thursday of each month at 26 Custom House St., Room 16. Secretary, C. J. Poyton, 269 Ohio Ave., Providence, R. I.

READING

Secretary, C. H. Bingham, 127 Greenwich St., Reading, Pa. (New Secretary not yet elected.) Regular meeting is held on the second Tuesday of each month.

ROCHESTER

Meets every second and fourth Friday of each month, at Hotel Seneca. Secretary, E. E. Fitch Jr., 607 Sawyer St., Rochester, N. Y.

SYRACUSE

Secretary, M. J. Crean, 109 Court St., Syracuse N. Y.

ST. LOUIS

Meets first Saturday of each month at Barr Branch Library, corner Jefferson and Lafayette Sts. Secretary, H. H. Williams, 4156 Botanical Ave., St. Louis, Mo.

TOLEDO

Meets first Thursday of each month at Toledo University Science Building, Electro-Platers' Room, corner Cherry and Page Sts. Secretary, H. L. Myers, 410 Palmer, Toledo, Ohio.

TORONTO

Meets second Thursday of each month at Occident Hall, Bathurst and Queen Sts. Secretary, C. Kemish, 671 Boston Ave., Toronto, Ontario, Canada.

WATERBURY

Secretary, Wm. Delage, 47 Prospect St., Waterbury, Conn.